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James G. Kendrick
*University of Nebraska - Lincoln*, jkendrick1@unl.edu

George H. Pfeiffer
*University of Nebraska - Lincoln*, gpfeiffer1@unl.edu

Roger Wilson
*University of Nebraska-Lincoln*, rwilson6@unl.edu

David J. Drozd

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G1402

# Preharvest Soybean Marketing Strategies

**Roger Wilson and David J. Drozd, Graduate Students;**
**George Pfeiffer, Associate Professor and Jim Kendrick, Professor Emeritus, Agricultural Economics**

This NebGuide provides strategies for using the futures market to obtain higher prices for soybeans.

Soybean producers who decide to use the futures market to price their crop are immediately faced with a number of decisions. Should a futures contract be used as a hedge to "lock in" a price, or should an options contract be used to establish a floor price? When should the position be established? Which futures contract month is most appropriate? The many decisions facing those using the futures market may be a reason some have decided not to use it at all.

The University of Nebraska completed a study analyzing various preharvest marketing strategies from 1988 to 1997. The study used daily futures and options prices and weekly decisions to identify basic strategies that consistently result in higher prices received than simply selling soybeans at harvest. The study calculated prices obtained by using hedges, put options, and "fences", a more complex strategy using put and call options. It compared the November and January contracts and various entry and exit strategies. It concludes that preharvest marketing strategies effectively increase the net soybean price received by producers.[1]

## Simple Calendar Hedges

A calendar hedge establishes positions at times during the year when prices are typically high. *Figure 1* shows that prices tend to peak twice during the growing season. The first peak is early in May and the second is toward the end of June. Placing hedges at these times to "lock in" high prices is logical.

A hedge established the third week of June using the November contract and liquidated on October 15 when the soybeans were sold at harvest resulted in the best net price

[1]Additional analysis of the study's results can be viewed at http://www.ag.uiuc.edu/~ne-qssb/strategies/index.htm

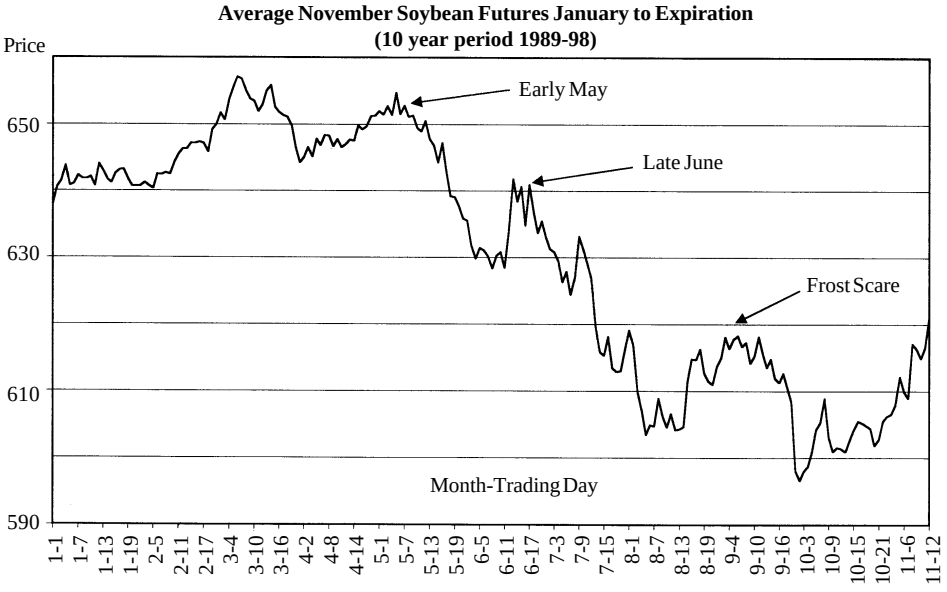


**Figure 1. Seasonal soybean price trends.**

received of any strategy analyzed in this study. It had a 10-year average net price of $6.37, a 48 cent per bushel gain over the 10-year average of $5.89 received from an October 15 cash sale at harvest, which was this study's base for comparisons. It was a consistently profitable strategy in that gains were made on the futures hedge in eight out of the 10 years between 1988 and 1997. The two losses were in the amounts of 35 and 42 cents.

A hedge set the first week in May also had good results. Its average net price received was $6.25, a 36 cent gain over the October 15 harvest sale. This strategy took losses in three of the 10 years, ranging from 16 cents to one dollar.

The reason the returns from hedging in June were higher than hedging in May was that the price for soybeans in 1988 rose dramatically between May and June. This sudden price increase in that one year resulted in a large profit for the 1988 June hedging strategy while causing a large loss for the 1988 May hedging strategy. When the 1988 prices are excluded from the study, gains from hedging in May increase from 36 to 51 cents per bushel while the June hedging strategies decrease from 48 to 34 cents per bushel. The strategies using the January contract were similarly impacted by the sudden surge in soybean prices in 1988.

## Moving Averages

Moving averages are a tool some use to decide when to establish a hedge. For example, a chart with nine and 18-day moving averages is shown on the CBOT web site. (http://www.cbot.com/mplex/vendors/mri/bots.htm)

When futures prices are trending higher, the short-term average is higher than the long-term average. As the price trend changes and goes down, the short-term average price will change more rapidly and will "cross" the long-term average from above. This cross is the signal to place a hedge.

This study included four strategies that used moving averages. None were as effective as the calendar hedges. Three of these strategies began April 15 and used moving averages of 18 and 45 days, nine and 45 days and four and nine days. The last moving average strategy began June 10 and used four and nine-day averages. If no triggers were encountered during this period of time, a hedge was not placed. All moving average strategies used the November contract.

The nine and 45-day and both four and nine-day averages resulted in profits ranging from 33 to 36 cents per bushel. These profits were lower than those obtained using the best *calendar hedges*. In addition, the simplicity in setting calendar hedges makes them preferred by most producers. The hedge using the 18 and 45-day averages showed a 7 cents per bushel gain which is substantially less successful than the other strategies.

## The Frost Scare

The final method for determining when to set a hedge used a percent increase in price as a "trigger" and was used to establish a hedge in September. The purpose of this strategy is to take advantage of a "frost scare" that occurs on a regular basis. This late season hedging opportunity allows producers to wait until they know the size of their soybean crop before using the futures market to establish prices.

The study showed that hedging after prices rose 2.5 percent from the September 1 price was an effective strategy but did not result in a hedge being set every year. This signal to hedge occurred in six out of 10 years, resulting in an average increase in price of 42 cents per bushel for these six years. When averaged over the entire 10-year time frame, the strategy's average net price received was $6.14, a 25 cent gain over the October 15 cash sale.

Although this study tried to detect frost scares by using this percent increase in price technique, most producers may be able to simply place hedges based on media coverage of weather concerns.

## The November Versus the January Contract

The study concludes that soybeans can be hedged successfully both the first week in May and the third week in June using either the November or January contracts. Results using the November contracts were slightly superior to those using the January contracts. Most of this difference is due to opportunity costs, storage costs at one cent per bushel per month, and handling costs of 7 cents per bushel that were assessed on the soybeans held for later sale.

November contracts were liquidated the Thursday nearest October 15, which the study had established as the harvest cash sale date. January contract hedges were either liquidated the Thursday nearest December 15 or the first Thursday after January 2 when the cash soybeans were sold. Cash soybeans were sold and hedges were liquidated on the same day.

The differences in average prices between the two contract months can be explained by costs associated with storing soybeans. Thus, the best strategy depends on an individual producer's storage situation. If a producer routinely puts the soybeans into on-farm storage at harvest, the handling costs do not need to be considered, making the January contract hedges liquidated around December 15 superior.

The advantage of using the November contract is that it has higher trading volume than the January contract. On the other hand, some soybean producers may elect to use the January contract because it provides them with protection on late harvested beans or for those beans sold after January 1 for tax purposes. These considerations may be more important than the differences in price received between these contract months.

## Put Options

Although put options may be effective in marketing soybeans, the results of put strategies included in this study were disappointing. It found that put options were a less effective soybean-pricing tool than futures hedges. The high cost (premium) to purchase put options was the major reason why they did not perform as favorably as futures hedges. Puts have advantages over hedging such as eliminating margin calls and allowing producers to take advantage of rising prices.

The techniques used for analyzing hedges also were applied to put options. The put option, however, has some differences that must be taken into consideration. First, option contracts mature in the month prior to futures contract expiration. Strategies compared holding options to expiration versus liquidating them approximately six weeks before expiration to recapture time value, but only negligible differences were seen in the overall prices received.

Another consideration is that various strike prices can be purchased with option contracts. This study included the

strike price nearest the futures price called the "at-the-money" strike price, two strike prices above the futures price called "in-the-money" options, and two strike prices below futures called "out-of-the-money" options. "In-the-money" puts are more expensive because they protect a higher price level. "Out-of-the-money" puts are popular as they reduce the capital needed to participate in the market.

The best put option strategy resulted in an average price of $6.04, a 15 cent gain over the harvest sale. This strategy bought a one strike "in-the-money" put in late June on the November contract for an average of 59 cents. The option was held until expiration and had four years of losses ranging from 15 to 66 cents. Rising prices late in the fall in 1995 and 1997 caused the options to expire without intrinsic value, so the entire option premium was lost, hurting the strategy's average gain.

General guidelines for using put options gleaned from this and other studies are:

- Purchase put options during the historical high price times, which are early in May and late June.
- "In-the-money" put options, although initially more expensive, consistently result in larger option profits than "out-of-the-money" options.
- November put options can be liquidated about six weeks prior to expiration if they have no intrinsic value to regain a portion of the option's time value. However, in most years, futures prices trend downward into the harvest time frame so liquidating the put option makes one prone to downside price risk.
- Moving average techniques were deemed ineffective in determining when to purchase puts.
- January put option contracts have low volume but can provide price protection for a longer portion of the fall time frame.

## Call Option Strategies

Preharvest call strategies have two main purposes: 1) selling a call to regain a portion of the premium (cost) of buying a put option (Fences) and 2) buying a call to provide protection against major price rises when a hedge was previously established (Synthetic puts).

### *Fences*

Fence strategies are most advantageous if implemented when calls are sold for the highest possible price. Proceeds from selling the call reduce the net premium paid for the put. Calls typically have their highest value as futures prices rise early in the crop year. The research shows fences are best established as futures prices peak in early May and late June.

Analyzing a fence established the first week of May resulted in an average net price received of $6.17, a 28 cent profit over the October 15 cash sale of $5.89. The largest profit was $1.36 and this strategy took a loss four years out of 10 ranging from 10 to 44 cents. The nearest "out-of-the-money" put was purchased for an average of 31 cents. Analysis of selling call strikes 50, 75 and 100 cents over the put strike showed that the 50 cent spread was the most profitable but only by a small amount. The 50 cent higher call was sold for an average of 29 cents, making the average net premium paid only 2 cents. This strategy did not time the major price rises in 1988 and 1995 correctly, hurting its average.

The same 50 cent fence strategy established the third week in June had a slightly higher put premium of 33 cents. The 50 cent higher call is now sold for an average of 30 cents, making the average net premium paid 3 cents. This strategy had losses three years out of 10 ranging from 7 to 21 cents. The highest profit was $1.95 and overall the strategy averaged a 39 cent profit. This strategy tied for the second-highest overall results—only the third week in June hedge strategy performed better at a 48 cent profit.

A "leg-on" fence allows producers to take some price protection early in the growing season and still sell the call when it is likely to have its highest value. Thus, in the first week of May, the first "out-of-the-money" put is purchased for 31 cents. Based on the seasonal trend for futures prices to peak the third week in June, a call was sold then for an average of 40 cents. The net premium of 9 cents is not paid but **received**. This strategy took losses in two years out of 10 in the amount of 33 and 34 cents. The highest profit was $1.25 and the average profit was 39 cents. This strategy tied for the second-highest overall results—only the third week in June hedge strategy performed better at a 48 cent profit. In two years the put option expired with no intrinsic value, but a profit was still gained based on the net premium received.

The drawback of a fence is that it limits the gains of a futures price rise to the strike price of the call option sold. Once the call has intrinsic value, the seller is required to maintain equity in the account. To minimize the odds of having to add margin, a fence should be established so that there is at least a 50 cent spread (i.e. 6.50 put strike and 7.00 call strike) to allow for price fluctuations and the call should be sold when futures are not likely to rise significantly.

### *Synthetic puts*

Although a synthetic put is not as profitable as a hedge, it does provide emotional and financial stress relief while maintaining the hedge for downside price protection.

Hedges "lock in" prices. The hedge protects against futures price declines and money will be made on the cash market if futures rise. However, hedgers are faced with margin calls as futures prices rise.

Margin calls may tempt producers to liquidate hedges in uptrending markets. However, if hedges are removed, a market decline creates a "double negative". First, the hedge has been closed at a loss. Second, the hedge will likely be reestablished at a lower price.

Owning a call option can offset hedge margin calls. Using this "synthetic put" still provides downside risk protection but limits the adverse aspects of rising futures prices.

The strategy bought a call if futures rose 50 cents above the May hedge price. This occurred four years out of 10 and ranged between May 16 and July 17. An "at-the-money" call was purchased for an average of 46 cents. All four years the option took a loss when held to expiration and the amount averaged 42 cents. Only once did the option expire with intrinsic value and it only partially offset the option premium. The hedge profit allowed the net price to be $6.08, a 19 cent gain over the October 15 cash sale. The problem with this strategy was that futures tended to decline into the harvest time frame, making the call worthless.

To minimize this problem, a strategy was developed to sell the call approximately 6-7 weeks before its expiration. After early September, the likelihood of a major rally is small. This helped retain the option's time value and did a better job

of capturing intrinsic value. The four years of significant price rise using this strategy have an average option loss of only 11 cents, perhaps an acceptable amount if margin calls are reduced. Overall, the strategy averaged a net price of $6.21, a 32 cent profit over the basic mid-October sale.

Strategies buying calls after 75 cent and $1 rises were also analyzed. The 75 cent strategy triggered three times and the $1 rise only happened twice. The same patterns occurred as holding until expiration had serious option losses while selling the call in early September captured more of the option's time and intrinsic value.

Fundamentally, synthetic puts are an insurance policy against major price rises. Having to pay an average of 46 cents upfront and ultimately taking an 11 cent loss shows that insurance is not cheap.

Hedgers must analyze their financial situation, risk tolerance, and current market outlook for price advances when determining if synthetic puts should be used.

### Putting It All Together

The research shows that high prices tend to occur seasonally in early May, late June, and early to mid September. Strategies were developed and analyzed based on these seasonal price trends.

Several preharvest strategies (hedges, fences) showed significant gains over an October 15 cash sale. However, the gains will only be realized on the amount of bushels marketed in that manner.

It is unlikely that a producer would price 100 percent of their crop during early May or late June. Yet, marketing only 5 to 10 percent in this time frame would not be extremely beneficial either. So how does one develop a low-risk marketing program that maximizes the net price received?

The authors' discussions led to the development of a conservative *seasonal marketing program.* This seasonal marketing program is a feasible way for producers to handle the emotional stress of dealing with the markets while obtaining substantial price improvements.

Specifically, as corn planting finishes and the number of bean acres is determined in May, 20 percent of the expected crop could be marketed based on an average yield estimate. As time progresses, based on growing conditions, adjustments to expected production may need to be made. A total of 60 percent of adjusted production could be priced by late June. This would allow most of the crop to be priced during traditional high price periods but leave room to make further sales if rallies continue.

A September frost scare presents another marketing opportunity. If the markets rally, up to 75 percent of adjusted expected production could be marketed. (an additional 15 percent) The frost scare strategy used a trigger of selling if futures rose 2.5 percent above the September 1 price. If a sell signal is not triggered, the crop remains 60 percent priced.

The remaining portion of the crop is unpriced. This insures the crop will not be overhedged and allows for production shortfalls.

Analyzing this percentage seasonal marketing strategy, the hedge the first week in May profited 36 cents. The hedge the third week in June gained 48 cents and the September hedge made an average of 41 cents on the six years it triggered or 25 cents if averaged over all ten years. Based on marketing 20 percent, an additional 40 percent and another 15 percent of production during these times, a **total of 30 cents is gained on every bushel produced**. This price improvement is less than the best strategy's 48 cent gain. However, the full 48 cents will only be obtained if 100 percent of production is hedged in late June. Hedging 100 percent leaves the risk of a production shortfall and substantial margin calls.

The strategy described reduces price risk by pricing only portions of the expected crop on the seasonal rallies. However, it is aggressive enough to significantly improve net price received. The advantage of this system is that a portion of the crop is priced in May, protecting prices if futures steadily decline throughout the growing season like in 1989 and 1992. In addition, producers benefit by capturing summertime rallies in years like 1988 and 1994 by pricing additional amounts later in the growing season. Seasonal marketing obtains a maximized overall price.

Percent seasonal marketing is a feasible program for most producers to implement. It was designed to help take the risk and stress out of marketing. If there is a concern over margin calls that accompany a hedging strategy, put or synthetic put strategies could be used. However, with the reduced risk of margin calls come reduced returns. Whatever the risk tolerance and strategy chosen, this research shows that producers taking preharvest price protection will be rewarded.

**Comparison of Strategies**

| *Strategy* | *Net Price* | *Largest Loss* | *Years of Loss* |
|---|---|---|---|
| October 15 Cash Sale | $5.89 | N/A | N/A |
| Hedge first week in May, Liquidate October 15 | $6.25 | $1.00 | 3 |
| Hedge third week in June, Liquidate October 15 | $6.37 | $0.42 | 2 |
| Buy at-the-money put first week in May, Hold to expire | $5.97 | $0.52 | 4 |
| Buy first in-the-money put third week in June, Hold to expire | $6.04 | $0.66 | 4 |
| Establish fence with 50 cent spread third week in June | $6.28 | $0.21 | 3 |
| Calendar fence buying put first week of May, Sell call in June | $6.28 | $0.34 | 2 |
| Hedge on Frost Scare if futures rise 2.5% over Sept. 1 price | $6.14 | No Losses | 0 |

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